

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 19-22, 25-28, and 30-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckland (CA 781,210, of record), Khattab (US 3,966,414), Jenke (DE 19643995, of record), Kanakkanatt (US 2005/0087725, of record), and Barrett (US 5,340,537, of record).

Buckland is directed to a pneumatic tire construction having a temperature indicating means arranged on the outer surface of the tire (Page 2, Lines 30+). The reference further teaches that temperature indicating means can be a variety of substances, provided it indicates a desired temperature and does not involve a complex apparatus (Page 3, Lines 15-20). While the reference fails to specifically suggest a temperature indicating means comprising a reactive substance and a dye, such a temperature indicating means is known, as shown for example by Khattab. In particular, Khattab is directed to a temperature indicator means comprising a free-radical sensitive dye (dye substance) and an organic peroxide (reactive substance), wherein the dye changes color due to a chemical reaction with free radicals (Column 2, Lines 20+). Khattab specifically states that such an indicating means is simple in operation and construction and thus, one of ordinary skill in the art at the time of the

invention would have been amply motivated to use such an indicating means in the tire of Buckland. Given the teachings of Buckland, one of ordinary skill in the art at the time of the invention would have found it obvious to use a wide variety of temperature indicating means, including the temperature indicating means of Khattab comprising a reactive substance (organic peroxide) and a dye for the reasons detailed above. It is emphasized that Khattab is broadly directed to a temperature indicating means and the use of such a means in the tire of Buckland is consistent with the teachings of Buckland.

Also, with respect to the independent claim, while Buckland is primarily concerned with monitoring the curing conditions, one of ordinary skill in the art at the time of the invention would have equally found it obvious to provide a temperature indication during running of the tire (in a cured condition). The general use of temperature indicating compounds to identify specific temperatures is known in the tire industry, as shown for example by Jenke. In this instance, Jenke discloses the use of temperature indicating compounds for targeted applications, such as extremely cold temperatures and high running temperatures (Pages 1 and 2 of translation). Kanakkanatt further recognizes the use of similar temperature indicating paints in cured pneumatic tires (Abstract). One of ordinary skill in the art at the time of the invention would have equally found it obvious to use the temperature indicating paint of Buckland in view of Khattab in a cured tire to indicate whether a tire has experienced extremely high running temperatures (which might lead to degradation of tire properties and life). It is emphasized that temperature indicating compounds are commonly used to identify

a wide variety of temperatures, including those in the vulcanization process and those during running.

Lastly, with respect to the independent claim, one of ordinary skill in the art at the time of the invention would have found it obvious to include an opaque medium in the indicator of Buckland in view of Khattab since such additives are commonly added in order to provide “color enhancement” to the color of the indicator, as shown for example by Barrett (Column 6, Lines 61+). It is further noted that this benefit appears to be directly analogous to that of the claimed invention (as set forth in the claim- visual background).

As to claims 20 and 21, Buckland suggests the use of two strips of temperature indicating material- such language suggests the use multiple reactive substances since they are designed to indicate different temperatures (Page 7, Lines 29-32).

With respect to claim 22, Figures 1-3 depict the temperature indicating means as being positioned in the shoulder region. Furthermore, one of ordinary skill in the art at the time of the invention would recognize that Buckland envisioned a plurality of arrangements as long as the temperature indicating means was on the tire rubber itself, as opposed to being attached to the interior of the mold (Page 3, Lines 1-10). Lastly, applicant has not provided a conclusive showing of unexpected results to establish a criticality for the claimed arrangement.

As to claim 23, Khattab suggests the use of any known free radical sensitive dye. While the reference fails to expressly teach the use of a carbonyl dye, one of ordinary skill in the art at the time of the invention would have found it obvious to use carbonyl

dyes (e.g. anthraquinones) since they represent one of the most well known and conventional chromogenic materials (dyes that change color) and applicant has not provided a conclusive showing of unexpected results to establish a criticality for the claimed dye. Lastly, it is noted that applicant has not challenged the examiner's assertion (as set forth in the previous communication) and as such, the use of such a dye is taken to be Admitted Prior Art.

Regarding claims 24-26, Khattab specifically suggests the use of benzoyl peroxide and applicant has not provided a conclusive showing of unexpected results to establish a criticality for the claimed radical initiator (Column 3, Lines 13-17). With specific respect to claim 26, the reference further teaches that additional substituents, such as methyl, can be included in the radical initiator (Column 2, Lines 65+).

With respect to claims 27 and 28, the amount of dye and organic peroxide (reactive substance) is a function of the desired temperature indicating means- the specific ratio would differ if the indicating means is activated at shorter durations or smaller temperatures. For example, the necessary amount of peroxide to indicate a certain temperature has been reached for 15 seconds as compared to 15 minutes is significantly different. Alternatively, the necessary amount of peroxide to indicate a temperature of 150 degrees Celsius as compared to 250 degrees Celsius is significantly different. One of ordinary skill in the art at the time of the invention would have been able to appropriately select the desired ratio as a function of the above noted parameters, including those ratios defined by the claimed invention. It is further noted

that applicant has not provided a conclusive showing of unexpected results to establish a criticality for the claimed ranges.

As to claim 30, Barrett suggests the inclusion of titanium dioxide.

Regarding claims 31-34 and 36-39, Khattab only describes the first and second component of the indicator- the reference is completely silent as the additional aspect or elements of the indicator (resins, additives, etc.). One of ordinary skill in the art at the time of the invention would have expected the indicator system of Khattab to be included in a base system or carrier system, as is conventional. Barrett provides one example of a similar indicator system in which the indicator is included or carried within a system comprising a binding material- Barrett includes a binder constituent, such as styrene butadiene rubber, polyvinyl alcohol, and acrylics (Column, Lines 49-60). These materials are seen to be “cross-linkable” materials. Furthermore, the language “low” temperature vulcanizing properties and “low” temperature polymerizing properties do not define over the binder materials noted above since the language comprises relative terms (anything can be viewed as low). A better way to define the binder might be to include the specific binder materials if such an embodiment is desired. It is emphasized that one of ordinary skill in the art at the time of the invention would have readily appreciated the inclusion of said indicator system in a conventional carrier system or binding system.

Regarding claims 35 and 40, as noted above, the binder can be an acrylic- one of ordinary skill in the art at the time of the invention would have found it obvious to use a wide variety of acrylic materials, including the claimed cyano-acrylate (represents a

known acrylic). Furthermore, applicant has not provided a conclusive showing of unexpected results to establish a criticality for the claimed binder compound.

With respect to claim 41, Khattab teaches an assembly in which a carrier is coated with a temperature indicating means. One of ordinary skill in the art at the time of the invention would have readily appreciated a method of adhesively bonding such a coated carrier to the tire surface of Buckland.

Response to Arguments

3. Applicant's arguments with respect to claims 19-22, 25-28, and 30-41 have been considered but are moot in view of the new ground(s) of rejection. It is further noted that the initial group of rejections involving Buckland, Barrett, Jenke, and Kanakkanatt has been withdrawn in light of applicant's amendments.

Regarding the second set of rejections, applicant argues that Khattab is silent with respect to applying its disclosed temperature indicators on or with a cured pneumatic tire. Furthermore, applicant contends that Khattab is primarily concerned with the application of such indicators on food storage systems. Lastly, regarding Khattab, applicant argues that the reference makes no mention of incorporating an opaque medium into its temperature indicators for any purpose.

While Khattab is silent as to a tire application, the reference is broadly directed to the field of temperature indicators. It is agreed that the reference is primarily concerned with a food storage application; however, the disclosure of a preferred embodiment does not preclude the use of the disclosed indicator system in additional applications. As detailed in the abstract and the claims, Khattab is generally directed to an indicator

system designed to signal the attainment of certain temperature characteristics- such a disclosure appears to independent of any specific application or environment. Given the general disclosure of Buckland, one of ordinary skill in the art at the time of the invention would have found it obvious to select any known temperature indicating system. In regards to the inclusion of an opaque medium, Barrett clearly teaches the inclusion of such a medium in a similar temperature indicating system to enhance the color of the indicating system, it being emphasized that this benefit is directly analogous to that detailed by applicant in the original disclosure.

As to Jenke, the reference is provided to evidence the use of similar temperature indicating systems for targeted applications, such as extremely cold temperatures and high running temperatures- one of ordinary skill in the art at the time of the invention would have found it obvious to use the temperature indicating means of Buckland in view of Khattab for a variety of applications, including during running (tire in a cured state). Kanakkanatt additionally recognizes the known use of similar temperature indicating means in cured pneumatic tires. Thus, the combination of references clearly evidences the known use of temperature indicating means (in general) in cured tires. It is agreed that these reference are not directed to the identical indicating system of Khattab; however, the references, as noted above, recognize the use of temperature indicating means (**in general**) in cured tires.

Lastly, the following comments are in response to three questions posed by applicant on pages 13 and 14:

- (a) the use of an irreversible indicating system in a “cured tire” allows one to identify the conditions experienced during running,
- (b) Buckland generally teaches the use of known temperature indicating systems and Khattab represents a suitable indicator system that is simple in operation and construction, and
- (c) one of ordinary skill in the art at the time of the invention would have found it obvious to include an opaque medium in the system of Khattab since it is recognized as enhancing the color effect of said system, as shown by Barrett, it being emphasized that this benefit appears to be identical to that detailed by applicant.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R. Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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